

Application Serial No: 10/553,616
Responsive to the Office Action mailed on: March 27, 2008

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IN THE CLAIMS

Amendments To The Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-2. (Cancelled)

3. (Currently Amended) ~~The~~ An optical disk control device ~~according to claim 1,~~
~~further~~ comprising:

a converging projecting means that converges and projects a light beam via an objective lens to an information carrier having a plurality of information surfaces;

a spherical aberration regulating means that sets the amount of spherical aberration of the focal point of the light beam that is converged by the converging projecting means, according to a target surface;

a focus-moving means that, by moving the objective lens, moves the focal point of the light beam converged by the converging projecting means in a direction normal to the surface of the information carrier;

a focus error detecting means that generates a focus error signal in response to the positional displacement of the focal point of the light beam with respect to the surfaces of the information carrier;

a reflected light quantity detecting means that detects a signal corresponding to the amount of light reflected from the information carrier; [[.]]

a phase relationship detecting means that detects the phase relationship between the focus error signal and the reflected light quantity signal based upon the level of the reflected light quantity signal from the reflected light quantity detecting means when the focus error signal takes a maximum value and a minimum value and the maximum value of the reflected light quantity signal from the reflected light quantity detecting means;

an information surface discriminating means that detects the target surface from the plurality of information surfaces of the information carrier based upon the phase

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relationship output from the phase relationship detecting means;

a reversal instruction means that outputs a reversal instruction using the output signal from the information surface detecting means;

a driving signal generating means, that, along with outputting a signal to the focus moving means to move the objective lens toward the information carrier, switches the signal so as to move the objective lens away from the information carrier in response to the reversal instruction, and outputs that signal;

a controlling means that, using the focus error signal, controls the focus moving means such that the focal point follows each of the information surfaces of the information carrier; and

a focus pulling-in means that switches an object of the operation from the driving signal generating means to the controlling means, and lets the focus moving means perform a focus pulling-in action.

~~wherein the focal point passage detecting means detects passage of the focal point based upon the output signal from the reflected light quantity detecting means.~~

4. (Currently Amended) The optical disk control device according to claim 3 [[1]], wherein the driving signal generating means outputs a signal having a slope of the driving waveform that changes when switching the signal in response to the reversal instruction.

5. (Withdrawn) The optical disk control device according to claim 3, further comprising:

an amplitude detecting means that detects the amplitude of the focus error signal;
a spherical aberration regulating means that sets the amount of spherical aberration of the focal point of the light beam that is converged by the converging projecting means, according to the target surface; and

an information surface detecting means that detects the target surface from the plurality of information surfaces of the information carrier, using the output signal from the amplitude detecting means.

6. (Withdrawn) The optical disk control device according to claim 5, further

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comprising a phase relationship detecting means that detects the phase relationship between the focus error signal and the reflected light quantity signal based upon the level of the reflected light quantity signal from the reflected light quantity detecting means when the focus error signal takes a maximum value and a minimum value and the maximum value of the reflected light quantity signal from the reflected light quantity detecting means, wherein the information surface detecting means detects the target surface from a plurality of information surfaces of the information carrier, based upon the phase relationship output from the phase relationship detecting means.

7. (Withdrawn) The optical disk control device according to claim 6, wherein the phase relationship detecting means detects the phase relationship between the focus error signal and the reflected light quantity signal under the condition that the level of the reflected light quantity signal from the reflected light quantity detecting means is at least a predetermined value when the focus error signal takes a maximum value and a minimum value.

8. (Currently Amended) ~~The An~~ optical disk control device ~~according to claim 1,~~ further comprising:

a converging projecting means that converges and projects a light beam via an objective lens to an information carrier having a plurality of information surfaces;

a focus-moving means that, by moving the objective lens, moves the focal point of the light beam converged by the converging projecting means in a direction normal to the surface of the information carrier;

a focus error detecting means that generates a focus error signal in response to the positional displacement of the focal point of the light beam with respect to the surfaces of the information carrier;

a focal point passage detecting means that detects that the focal point of the light beam has passed the surface and the information surfaces of the information carrier;

a reversal instruction means that outputs a reversal instruction using the output signal from the focal point passage detecting means;

a driving signal generating means, that, along with outputting a signal to the

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focus moving means to move the objective lens toward the information carrier, switches the signal so as to move the objective lens away from the information carrier in response to the reversal instruction, and outputs that signal;

a controlling means that, using the focus error signal, controls the focus moving means such that the focal point follows each of the information surfaces of the information carrier;

a focus pulling-in means that switches an object of the operation from the driving signal generating means to the controlling means, and lets the focus moving means perform a focus pulling-in action; and

a movement amount managing detecting means A that manages and detects that the focal point moves a predetermined amount after the focal point passage detecting means detects passage of the focal point,

wherein the reversal instruction means outputs a reversal instruction based upon the output signal from the movement amount managing detecting means A.

9. (Cancelled)

10. (Original) The optical disk control device according to claim 8, further comprising an information surface discriminating means that discriminates whether or not the surface that the focal point passage detecting means has detected is the target surface for which focus pulling-in is to be performed, wherein the reversal instruction means outputs a reversal instruction using the output signal from the information surface discriminating means in addition to the output signal from the movement amount managing detecting means A.

11-17. (Cancelled)

18. (Previously Presented) The optical disk control device according to claim 8, further comprising a velocity setting means that calculates the velocity that will drive the objective lens in response to the rotational velocity of the information carrier, and sets the calculated velocity in the driving signal generating means.